HAD IT WITH ERROR CODES?
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PRO CARD

Compiled by Terry Barker

Table of Contents

Page	Description
1-2	ASCII values and op codes
3	BASIC and ASSEMBLER error codes
4	Player-missile map and memory locations
5	OPERATING SYSTEM memory locations
6	Graphics modes, joystick values, console switch settings
7	Setcolor table, display list format
8	Internal character set displacements
9	ATARI 825, EPSON MX-80 printer codes
10	NEC printer codes, I/O command codes, OPEN codes
11-13	Useful memory locations

PRO CARD

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ASCII VALUES AND OP CODES

DEC	HEX	CHR	OP CODE	FORMAT	DEC	HEX	CHR	OP CODE	FORMAT
0	0	♥,	BRK		64	40	@	RTI	
1	1	├A	ORA	(M,X)	65	41	A	EOR	(M,X)
2	2	│B			66	42	B		
3	3	┘C			67	43	C		
4	4	┤D			68	44	D		
5	5	┐E	ORA	Z	69	45	E	EOR	Z
6	6	/F	ASL	Z	70	46	F	LSR	Z
7	7	\G			71	47	G		
8	8	◢H	PHP		72	48	H	PHA	
9	9	▗I	ORA	IM	73	49	I	EOR	IM
10	A	◣J	ASL	A	74	4A	J	LSR	A
11	B	▝K			75	4B	K		
12	C	▘L			76	4C	L	JMP	M
13	D	▔M	ORA	M	77	4D	M	EOR	M
14	E	▁N	ASL	M	78	4E	N	LSR	M
15	F	▖O			79	4F	O		
16	10	♣P	BPL	REL	80	50	P	BVC	REL
17	11	┌Q	ORA	(M),Y	81	51	Q	EOR	(M),Y
18	12	─R			82	52	R		
19	13	┼S			83	53	S		
20	14	●T			84	54	T		
21	15	▄U	ORA	Z,X	85	55	U	EOR	Z,X
22	16	▎V	ASL	Z,X	86	56	V	LSR	Z,X
23	17	┬W			87	57	W		
24	18	┴X	CLC		88	58	X	CLI	
25	19	▌Y	ORA	M,Y	89	59	Y	EOR	M,Y
26	1A	└Z			90	5A	Z		
27	1B	␛			91	5B	[		
28	1C	↑			92	5C	\		
29	1D	↓	ORA	M,X	93	5D	]	EOR	M,X
30	1E	←	ASL	M,X	94	5E	^	LSR	M,X
31	1F	→			95	5F	_		
32	20	SP	JSR	M	96	60	♦.	RTS	
33	21	!	AND	(M,X)	97	61	a	ADC	(M,X)
34	22	"			98	62	b		
35	23	#			99	63	c		
36	24	$	BIT	Z	100	64	d		
37	25	%	AND	Z	101	65	e	ADC	Z
38	26	&	ROL	Z	102	66	f	ROR	Z
39	27	'			103	67	g		
40	28	(	PLP		104	68	h	PLA	
41	29	)	AND	IM	105	69	i	ADC	IM
42	2A	*	ROL	A	106	6A	j	ROR	A
43	2B	+			107	6B	k		
44	2C	,	BIT	M	108	6C	l	JMP	(M)
45	2D	-	AND	M	109	6D	m	ADC	M
46	2E	.	ROL	M	110	6E	n	ROR	M
47	2F	/			111	6F	o		
48	30	0	BMI	REL	112	70	p	BVS	REL
49	31	1	AND	(M),Y	113	71	q	ADC	(M),Y
50	32	2			114	72	r		
51	33	3			115	73	s		
52	34	4			116	74	t		
53	35	5	AND	Z,X	117	75	u	ADC	Z,X
54	36	6	ROL	Z,X	118	76	v	ROR	Z,X
55	37	7			119	77	w		
56	38	8	SEC		120	78	x	SEI	
57	39	9	AND	M,Y	121	79	y	ADC	M,Y
58	3A	:			122	7A	z		
59	3B	;			123	7B	♠;		
60	3C	<			124	7C	|		
61	3D	=	AND	M,X	125	7D	↰	ADC	M,X
62	3E	>	ROL	M,X	126	7E	◀	ROR	M,X
63	3F	?			127	7F	▶		

DEC	HEX	CHR	OP CODE	FORMAT	DEC	HEX	CHR	OP CODE	FORMAT
128	80	,			192	C0	@	CPY	IM
129	81	A	STA	(M,X)	193	C1	A	CMP	(M,X)
130	82	B			194	C2	B		
131	83	C			195	C3	C		
132	84	D	STY	Z	196	C4	D	CPY	Z
133	85	E	STA	Z	197	C5	E	CMP	Z
134	86	F	STX	Z	198	C6	F	DEC	Z
135	87	G			199	C7	G		
136	88	H	DEY		200	C8	H	INY	
137	89	I			201	C9	I	CMP	IM
138	8A	J	TXA		202	CA	J	DEX	
139	8B	K			203	CB	K		
140	8C	L	STY	M	204	CC	L	CPY	M
141	8D	M	STA	M	205	CD	M	CMP	M
142	8E	N	STX	M	206	CE	N	DEC	M
143	8F	O			207	CF	O		
144	90	P	BCC	REL	208	D0	P	BNE	REL
145	91	Q	STA	(M),Y	209	D1	Q	CMP	(M),Y
146	92	R			210	D2	R		
147	93	S			211	D3	S		
148	94	T	STY	Z,X	212	D4	T		
149	95	U	STA	Z,X	213	D5	U	CMP	Z,X
150	96	V	STX	Z,Y	214	D6	V	DEC	Z,X
151	97	W			215	D7	W		
152	98	X	TYA		216	D8	X	CLD	
153	99	Y	STA	M,Y	217	D9	Y	CMP	M,Y
154	9A	Z	TXS		218	DA	Z		
155	9B	(EOL)			219	DB	[		
156	9C	↑			220	DC	\		
157	9D	↓	STA	M,X	221	DD	]	CMP	M,X
158	9E	←			222	DE	^	DEC	M,X
159	9F	→			223	DF	_		
160	A0	█	LDY	IM	224	E0	◆	CPX	IM
161	A1	!	LDA	(M,X)	225	E1	a	SBC	(M,X)
162	A2	"	LDX	IM	226	E2	b		
163	A3	#			227	E3	c		
164	A4	$	LDY	Z	228	E4	d	CPX	Z
165	A5	%	LDA	Z	229	E5	e	SBC	Z
166	A6	&	LDX	Z	230	E6	f	INC	Z
167	A7	'			231	E7	g		
168	A8	(	TAY		232	E8	h	INX	
169	A9	)	LDA	IM	233	E9	i	SBC	IM
170	AA	*	TAX		234	EA	j	NOP	
171	AB	+			235	EB	k		
172	AC	,	LDY	M	236	EC	l	CPX	M
173	AD	-	LDA	M	237	ED	m	SBC	M
174	AE	.	LDX	M	238	EE	n	INC	M
175	AF	/			239	EF	o		
176	B0	0	BCS	REL	240	F0	p	BEQ	REL
177	B1	1	LDA	(M),Y	241	F1	q	SBC	(M),Y
178	B2	2			242	F2	r		
179	B3	3			243	F3	s		
180	B4	4	LDY	Z,X	244	F4	t		
181	B5	5	LDA	Z,X	245	F5	u	SBC	Z,X
182	B6	6	LDX	Z,Y	246	F6	v	INC	Z,X
183	B7	7			247	F7	w		
184	B8	8	CLV		248	F8	x	SED	
185	B9	9	LDA	M,Y	249	F9	y	SBC	M,Y
186	BA	:	TSX		250	FA	z		
187	BB	;			251	FB	♠		
188	BC	<	LDY	M,X	252	FC	|		
189	BD	=	LDA	M,X	253	FD	↰	SBC	M,X
190	BE	>	LDX	M,Y	254	FE	◀	INC	M,X
191	BF	?			255	FF	▶		

BASIC ERROR CODES

2	Memory insufficient
3	Value error
4	Too many variables
5	String length error
6	Out of data
7	Number greater than 32,767
8	Input statement error
9	Array or string DIM error
10	Argument stack overflow
11	Floating point overflow/underflow error
12	Line not found
13	No matching FOR statement
14	Line too long
15	GOSUB or FOR line deleted
16	RETURN error
17	Garbage error
18	Invalid string character

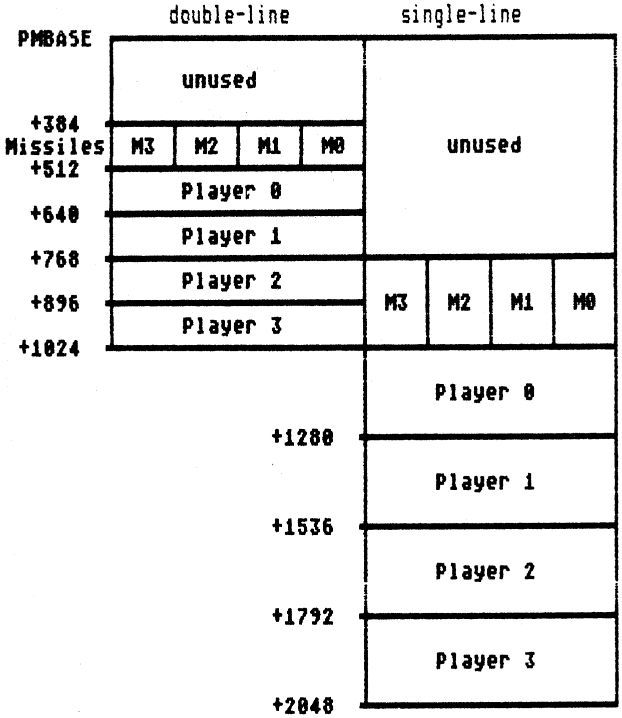
ASSEMBLER ERROR CODES

1	Memory insufficient
2	First parameter in DEL command invalid
3	Invalid address (mini-assembler)
4	The file named cannot be loaded
5	Undefined label reference
6	Syntax error
7	Label defined more than once
8	Buffer overflow
9	There is no label or "*" before "="
10	The value of an expression is greater than 255 - only one byte was required
11	A null string has been used where invalid
12	Address or address type specified is incorrect
13	Phase error - inconsistent result between Pass 1 and 2
14	Undefined forward reference
15	Line is too large
16	Unrecognizable statement
17	Line number too large
18	LOMEM not first command
19	No starting address

I/O ERRORS

19	LOAD program too long
20	Device number larger than 7 or equal to 0
21	LOAD file error
28	BREAK abort
129	IOCB already open
130	Nonexistent device
131	IOCB write only
132	Invalid command
133	Device or file not open
134	Bad IOCB number
135	IOCB read only error
136	EOF has been reached
137	Truncated record
138	Device timeout
139	Garbage from device
140	Serial bus error
141	Cursor out of range
142	Serial bus overrun
143	Serial bus checksum
144	Device done error
145	Read after write compare error
146	Function not implemented
147	Insufficient RAM
160	Drive number error
161	Too many OPEN files
162	Disk full
163	Unrecoverable data I/O error
164	File number mismatch
165	File name error
166	POINT data length error
167	File locked
168	Command invalid
169	Directory full
170	File not found
171	POINT invalid

PLAYER-MISSILE MEMORY MAP



Dec	Hex	Function
559	22F	Resolution - poke 62 for single line, 46 for double line
623	26F	Priorities - one bit on only 1: all players have priority over all playfield registers 4: all playfield registers have priority over all players 2: mixed, P0 & P1, then playfield, then P2 & P3 8: mixed, PF0 & PF1, then all players, then PF2 & PF3
704	2C0	Color of player-missile 0
705	2C1	Color of player-missile 1
706	2C2	Color of player-missile 2
707	2C3	Color of player-missile 3
53248	D000	Horiz. pos. of P0 - M0 to PF coll. reg.
53249	D001	Horiz. pos. of P1 - M1 to PF coll. reg.
53250	D002	Horiz. pos. of P2 - M2 to PF coll. reg
53251	D003	Horiz. pos. of P3 - M3 to PF coll. reg.
53252	D004	Horiz. pos. of M0 - P0 to PF coll. reg.
53253	D005	Horiz. pos. of M1 - P1 to PF coll. reg.
53254	D006	Horiz. pos. of M2 - P2 to PF coll. reg.
53255	D007	Horiz. pos. of M3 - P3 to PF coll. reg.
53256	D008	Size of player 0 (0=normal, 1=double, 3=quadruple) - M0 to players coll. reg.
53257	D009	Size of P1 - M1 to players coll. reg.
53258	D00A	Size of P2 - M2 to players coll. reg.
53259	D00B	Size of P3 - M3 to players coll. reg.
53260	D00C	Missile size - P0 to players coll. reg.
53261	D00D	P0 gr. data - P1 to players coll. reg.
53262	D00E	P1 gr. data - P2 to players coll. reg.
53263	D00F	P2 gr. data - P3 to players coll. reg.
53264	D010	P3 gr. data
53265	D011	Missiles gr. data
53277	D01D	3 to enable P/M graphics, 0 to disable
54279	D407	Address of PMBASE

OPERATING SYSTEM MEMORY MAP

```
 Dec    Hex          Contents
-------------------------------------------------
65555  FFFF  Operating system ROM
57344  E000
-------------------------------------------------
57343  DFFF  Floating point ROM
55296  D800
-------------------------------------------------
55295  D7FF  Hardware registers
53248  D000
-------------------------------------------------
53247  CFFF  Not used
49152  C000
-------------------------------------------------
49151  BFFF  Cartridge slot A
40960  A000  (may be RAM if no A or B cartridge)
-------------------------------------------------
40959  9FFF  Cartridge slot B
32768  8000  (may be RAM if no B cartridge)
-------------------------------------------------
32767  7FFF  Display data
             (will be higher if no cartridge B)
----------------------------------------← 88, 89
31755  7C1F  Display list (size varies)
             (numbers given for 32k system only)
----------------------------------------← 560, 561
             Free RAM
-------------------------------------------------
             BASIC string array table
----------------------------------------← 140, 141
             BASIC program
----------------------------------------← 136, 137
             BASIC variable value table
----------------------------------------← 134, 135
             BASIC variable name table
----------------------------------------← 130, 131
             System and BASIC overhead

----------------------------------------← 743, 744
             DISK OPERATING SYSTEM II
 6781  1A7D  Disk I/O buffers
-------------------------------------------------
 6780  1A7C  Mini-DOS
 5440  1540  (RAM resident portion of DUP)
-------------------------------------------------
 5439  153F  File management system RAM
 1792   700
-------------------------------------------------
 1791   6FF  Free RAM
 1536   600
-------------------------------------------------
 1535   5FF  Floating point (used by BASIC)
 1406   57E
-------------------------------------------------
 1405   57D  BASIC cartridge
 1152   480
-------------------------------------------------
 1151   47F  OPERATING SYSTEM RAM
 1021   3FD  Cassette buffer
```

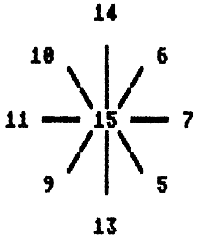
OPERATING SYSTEM MEMORY MAP

Dec	Hex	Contents
1020	3FC	Reserved
1000	3E8	
999	3E7	Printer buffer
960	3C0	
959	3BF	IOCB's
832	340	
831	33F	Miscellaneous variables
512	200	
511	1FF	Hardware stack
256	100	
255	FF	Page zero
212	D4	Floating point (used by BASIC)
211	D3	BASIC or cartridge program
210	D2	
209	D1	Free BASIC RAM
208	D0	
207	CF	Free BASIC and ASSEMBLER RAM
203	CB	
202	CA	Free ASSEMBLER RAM
176	B0	
175	AF	Assembler zero page
128	80	
127	7F	Operating system RAM
0	0	

MODES AND SCREEN FORMATS

Gr. Mode	Mode Type	Cols	Rows Split Screen	Rows Full Screen	# of Colors	RAM Required (bytes)
0	TEXT	40	-	24	1	993
1	TEXT	20	20	24	5	513
2	TEXT	20	10	12	5	261
3	GRAPHICS	40	20	24	4	273
4	GRAPHICS	80	40	48	2	537
5	GRAPHICS	80	40	48	4	1017
6	GRAPHICS	160	80	96	2	2025
7	GRAPHICS	160	80	96	4	3945
8	GRAPHICS	320	160	192	1	7900

JOYSTICK



CONSOLE SWITCHES

KEY VALUE	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
OPTION	X	X	X	X				
SELECT	X	X			X	X		
START	X		X		X		X	

PEEK(53279)   X=KEY PRESSED

SETCOLOR TABLE

Default Colors	Mode or Condition	SETCOLOR Color	Color	Comments
		0	COLOR data	-
Lt. blue	Mode 0,	1	actually	Char. lum.
Dk. blue	all text	2	determines	Bkgrnd.
	windows	3	char. to	-
Black		4	be plotted	Border
Orange		0	COLOR data	Char.
Lt. green	Modes 1	1	determines	Char.
Dk. blue	and 2	2	char. to	Char.
Red	(text	3	be plotted	Char.
Black	modes)	4		Bkgrnd., border
Orange		0	1	Gr. point
Lt. green	Modes 3,	1	2	Gr. point
Dk. blue	5, and 7	2	3	Gr. point
		3	-	-
Black		4	0	Gr. point, bkgrnd, border
Orange		0	1	Gr. point
	Modes 4	1	-	-
	and 6	2	-	-
		3	-	-
Black		4	0	Gr. point, bkgrnd, border
		0	-	-
Lt. blue	Mode 8 (1 color	1	1	Gr. point luminance
Dk. blue	2 luminances)	2	0	Gr. point, bkgrnd default
		3	-	-
Black		4	-	Border

DISPLAY LIST FORMAT

Graphics 0 Display List (in hex):

```
70 70 70 42 40 5C 02 02 02 02 02 02 02 02 02 02
02 02 02 02 02 02 02 02 02 02 02 02 02 41 20 5C
```

Corresponding image:

```
BB BB BB 4M LL HH 0M 0M 0M 0M 0M 0M 0M 0M 0M 0M
0M 0M 0M 0M 0M 0M 0M 0M 0M 0M 0M 0M 0M 41 LL HH
```

where BB is 8 scan lines of background (top border of screen), 4M is the graphics mode of the first line of the screen display ('4' required), LL is the low byte of the address of screen RAM, HH is the high byte of the address of screen RAM, M is the graphics mode of the second and successive lines of the screen display, and 41 is the end-of list byte. Following is a table of graphics modes selected by values of M:

M	2	6	7	8	9	A	B	D	F
Gr. mode	0	1	2	3	4	5	6	7	8

INTERNAL CHARACTER SET

DIS	HX	ASC	HX	INT	CHR	DIS	HX	ASC	HX	INT	CHR
0	0	32	20	33	SP	64	40	0	0	160	♥,
1	1	33	21	95	!	65	41	1	1	191	├A
2	2	34	22	94	"	66	42	2	2	149	▎B
3	3	35	23	90	#	67	43	3	3	146	┘C
4	4	36	24	88	$	68	44	4	4	186	┤D
5	5	37	25	93	%	69	45	5	5	170	┐E
6	6	38	26	91	&	70	46	6	6	184	╱F
7	7	39	27	115	'	71	47	7	7	189	╲G
8	8	40	28	112	(	72	48	8	8	185	◢H
9	9	41	29	114	)	73	49	9	9	141	▗I
10	A	42	2A	7	*	74	4A	10	A	129	◣J
11	B	43	2B	6	+	75	4B	11	B	133	▝K
12	C	44	2C	32	,	76	4C	12	C	128	▘L
13	D	45	2D	14	-	77	4D	13	D	165	▔M
14	E	46	2E	34	.	78	4E	14	E	163	▁N
15	F	47	2F	38	/	79	4F	15	F	136	▖O
16	10	48	30	50	0	80	50	16	10	138	♣P
17	11	49	31	31	1	81	51	17	11	175	┌Q
18	12	50	32	30	2	82	52	18	12	168	─R
19	13	51	33	26	3	83	53	19	13	190	┼S
20	14	52	34	24	4	84	54	20	14	173	●T
21	15	53	35	29	5	85	55	21	15	139	▄U
22	16	54	36	27	6	86	56	22	16	144	▏V
23	17	55	37	51	7	87	57	23	17	174	┬W
24	18	56	38	53	8	88	58	24	18	150	┴X
25	19	57	39	48	9	89	59	25	19	171	▌Y
26	1A	58	3A	66	:	90	5A	26	1A	151	└Z
27	1B	59	3B	2	;	91	5B	27	1B	28	␛
28	1C	60	3C	54	<	92	5C	28	1C	142	↑
29	1D	61	3D	15	=	93	5D	29	1D	143	↓
30	1E	62	3E	55	>	94	5E	30	1E	134	←
31	1F	63	3F	102	?	95	5F	31	1F	135	→
32	20	64	40	117	@	96	60	96	60	162	♦
33	21	65	41	127	A	97	61	97	61	63	a
34	22	66	42	85	B	98	62	98	62	21	b
35	23	67	43	82	C	99	63	99	63	18	c
36	24	68	44	122	D	100	64	100	64	58	d
37	25	69	45	106	E	101	65	101	65	42	e
38	26	70	46	120	F	102	66	102	66	56	f
39	27	71	47	125	G	103	67	103	67	61	g
40	28	72	48	121	H	104	68	104	68	57	h
41	29	73	49	77	I	105	69	105	69	13	i
42	2A	74	4A	65	J	106	6A	106	6A	1	j
43	2B	75	4B	69	K	107	6B	107	6B	5	k
44	2C	76	4C	64	L	108	6C	108	6C	0	l
45	2D	77	4D	101	M	109	6D	109	6D	37	m
46	2E	78	4E	99	N	110	6E	110	6E	35	n
47	2F	79	4F	72	O	111	6F	111	6F	8	o
48	30	80	50	74	P	112	70	112	70	10	p
49	31	81	51	111	Q	113	71	113	71	47	q
50	32	82	52	104	R	114	72	114	72	40	r
51	33	83	53	126	S	115	73	115	73	62	s
52	34	84	54	109	T	116	74	116	74	45	t
53	35	85	55	75	U	117	75	117	75	11	u
54	36	86	56	80	V	118	76	118	76	16	v
55	37	87	57	110	W	119	77	119	77	46	w
56	38	88	58	86	X	120	78	120	78	22	x
57	39	89	59	107	Y	121	79	121	79	43	y
58	3A	90	5A	87	Z	122	7A	122	7A	23	z
59	3B	91	5B	96	[	123	7B	123	7B	130	♠;
60	3C	92	5C	70	\	124	7C	124	7C	79	|
61	3D	93	5D	98	]	125	7D	125	7D	118	↰
62	3E	94	5E	71	^	126	7E	126	7E	52	◀
63	3F	95	5F	78	_	127	7F	127	7F	44	▶

ATARI KEY	39	DELETE LINE	116
RETURN KEY	12	DELETE CHAR.	180
INSERT LINE	119	CAPS/LOWR	60
INSERT CHAR.	183		

PRINTER CODES

ATARI 825

Dec	Hex	ASCII	FUNCTION
8	8	◢	Backspace
10	A	◣	Forward line feed
13	D	▔	Carriage return
15	F	▖	Start underlining
14	E	▁	Stop underlining
27 n	1B n	ESC n	n dot spaces
27 10	1B A	ESC ◣	Full reverse line feed
27 14	1B E	ESC ▁	Start elongated printing
27 15	1B F	ESC ▖	Stop elongated printing
27 17	1B 11	ESC ┌	Proportionally spaced char. set
27 19	1B 13	ESC ┼	10 cpi monospaced char. set
27 20	1B 14	ESC ●	16.7 condensed char. set
27 28	1B 1C	ESC ↑	Feed half-line forward
27 30	1B 1E	ESC ←	Feed half-line reverse

EPSON MX-80

27 48	1B 30	ESC 0	Sets line sp. to 8 lpi
27 49	1B 31	ESC 1	Sets line sp. to 7/72 per line
27 50	1B 32	ESC 2	Sets line sp. to 6 lpi
27 51	1B 33	ESC 3 n	Sets line sp. n/216 of an inch
27 52	1B 34	ESC 4	Italics char. set
27 53	1B 35	ESC 5	Standard char. set
27 56	1B 38	ESC 8	Enables paper transfer
27 57	1B 39	ESC 9	Cancels paper out function
27 58	1B 3A	ESC :	RADIO SHACK mode
27 59	1B 3B	ESC ;	Cancels RADIO SHACK mode
27 60	1B 3C	ESC <	Home head
27 61	1B 3D	ESC =	Clears the M.S.B. function
27 62	1B 3E	ESC >	M.S.B. function
27 63	1B 3F	ESC ?	n1-n37 Redefines escape codes
27 64	1B 40	ESC @	Resets printer
27 65	1B 41	ESC A n	Sets line sp. to n/72 inch
27 66	1B 42	ESC B	n1 n2...null:255 Set vert. tabs
27 67	1B 43	ESC C n	Sets form length to n lines
27 68	1B 44	ESC D	n1 n2...null:255 Sets horiz. tabs
27 69	1B 45	ESC E	Emphasized print mode
27 70	1B 46	ESC F	Cancels emphasized print mode
27 71	1B 47	ESC G	Double strike mode
27 72	1B 48	ESC H	Cancels double strike mode
27 74	1B 4A	ESC J	~~n1 n2 960 bit image at 480 speed~~
27 75	1B 4B	ESC K	n1 n2 480 bit image mode
27 76	1B 4C	ESC L	n1 n2 960 bit image mode
27 80	1B 50	ESC P	~~Compressed char. mode 16.5 cpi~~
27 81	1B 51	ESC Q	~~Cancels compressed char. mode~~
27 83	1B 53	ESC S	~~Expanded char. set 5 cpi~~
27 54	1B 54	ESC T	~~Cancels expanded char. mode~~
7	7	╲	Bell character
8	8	◢	Backspace
9	9	▗	Horiz. tab
10	A	◣	Line feed
139 11	B	▝	Vertical tab
140 12	C	▘	Form feed
13	D	▔	Carriage return
14	E	▁	Shift out (expanded char.)
15	F	▖	Shift in
15 ~~14~~	F ~~E~~	▖▁	Condensed/~~expanded~~ mode
17	11	┌	~~DC1 - select printer~~
146 18	12	─	DC2 - cancels condensed mode
19	13	┼	~~DC3 - deselects printer~~
148 20	14	●	DC4 - cancels expanded mode
127	7F	▶	Delete last char.

PRINTER CODES

NEC 8023A

Dec	Hex	ASCII	FUNCTION
8	8	◢	Backspace
9	9	▪	Horiz. tab
10	A	◣	Line feed
11	B	▪	Vertical tab
12	C	▪	Form feed
13	D	▔	Carriage return
14	E	▁	Shift out (expanded char.)
15	F	▪	Shift in
18	12	═	Enlarged char. moe - JA7
19	13	┼	DC3 - deselects prer
20	14	●	Clears enlarged char. - JA7
24	18	┴	Cancels print lin
29	1D	↓	Load VFU
30	1E	←	Terminates VFU setting
31	1F	→ n	Vert. tab to CHn
34	22	"	DC1 - select printer
27 n	1B n	ESC n	n dot spaces (1-6)
27 33	1B 21	ESC !	Enhanced char. mode
27 34	1B 22	ESC "	Clears enhanced char. mode
27 35	1B 23	ESC #	Internal graphics pattern
27 36	1B 24	ESC $	Default char. set
27 40	1B 28	ESC (	n1,n2...n16 Set horiz. tabs
27 41	1B 29	ESC)	n1,n2...n16 Clear horiz tabs
27 50	1B 32	ESC 2	Clears all horiz.tabs
27 65	1B 41	ESC A	Sets line sp. to 6 lpi
27 66	1B 42	ESC B	Sets line sp. to 8 lpi
27 69	1B 45	ESC E	Sets 12 cpi
27 76	1B 4C	ESC L	n2 n1 n0 Sets left margin
27 78	1B 4E	ESC N	Sets 10 cpi
27 80	1B 50	ESC P	Proportional spacng
27 81	1B 51	ESC Q	Sets 17 cpi
27 83	1B 53	ESC S	n3...n0 Sets dot-image graphics
27 84	1B 54	ESC T	n1 n0 Sets line sp.to n/44 in.
27 88	1B 58	ESC X	Start underlining
27 89	1B 59	ESC Y	Stop underlining
27 91	1B 5B	ESC [	Sets incremental mode
27 93	1B 5D	ESC]	Set logical-seeking mode
27 96	1B 60	ESC ◆	Selec. of all printers cleared
27 97	1B 61	ESC n	Select n device
27 102	1B 66	ESC f	Sets forward line feed
27 114	1B 72	ESC r	Sets reverse line feed

I/O COMMAND CODES

CODE	OPERATION
3	OPEN
5	GET Record
7	GET Characters
9	PUT Record
11	PUT Characters
12	CLOSE
13	STATUS Request
32	RENAME
33	DELETE
35	LOCK File
36	UNLOCK File

OPEN CODES

CODE	MODE
4	Input operation
6	Disk directory input operation
8	Output operation
9	EOF append operation
12	Input/output operation

USEFUL MEMORY LOCATIONS

Dec	Hex	Len	Function
2	2	2	Cassette initialization address
8	8	1	Warm start flag
9	9	1	Cassette/disk boot flag (1=disk,2=cass.)
10	A	2	Address of DOS or memo pad
12	C	2	Disk initialization address
14	E	2	Highest memory location in use by cartridge
16	10	1	Pokey interrupt mask
17	11	1	Break key flag (0=pressed)
18	12	3	TV frame counter (msb first)
32	20	12	Page zero IOCB
65	41	1	Noisy I/O flag (0=quiet)
66	42	1	Critical code flag
77	4D	1	Attract mode flag (0=no attract
82	52	1	Text left margin
83	53	1	Text right margin
84	54	1	Graphics cursor row
85	55	2	Graphics cursor column
87	57	1	Current graphics mode
88	58	2	Address of screen memory
90	5A	1	Previous graphics cursor row
91	5B	2	Previous graphics cursor column
93	5D	1	Data under cursor
94	5E	2	Cursor memory address
96	60	1	Cursor row to which DRAWTO will go
97	61	2	Cursor column to which DRAWTO will go
99	63	1	Cursor logical line column number
106	6A	1	Number of pages of RAM
128	80	2	BASIC low memory pointer
130	82	2	Address of variable name table
132	84	2	Address of end of variable name table
134	86	2	Address of variable value table
136	88	2	Address of BASIC program
138	8A	2	Address of current statement
140	8C	2	Address of string/array table
142	8E	2	Address of BASIC stack
144	90	2	Address of BASIC top of memory
186	BA	2	Line number where STOP or TRAP occurred
195	C3	1	Error number
201	C9	1	Print statement tab width
212	D4	2	Value to be returned from USR function
251	FB	1	Radians/degrees flag (0=radians,6=deg.)
512	200	2	Display list interrupt routine
514	202	2	Serial bus proceed IRQ routine
516	204	2	Serial bus interrupt IRQ routine
518	206	2	Break instruction interrupt routine
520	208	2	Keyboard interrupt routine
522	20A	2	Serial bus input ready IRQ routine
524	20C	2	Serial bus output ready IRQ routine
526	20E	2	Serial bus output complete IRQ
528	210	2	Pokey timer 1 IRQ routine
530	212	2	Pokey timer 2 IRQ routine
532	214	2	Pokey timer 4 IRQ routine
534	216	2	Immediate IRQ vector
536	218	10	Countdown timers 1 - 5
546	222	2	VBLANK immediate vector
548	224	2	VBLANK deferred vector
550	226	4	Countdown timers 1 - 2 JSR addresses
554	22A	2	Countdown timer 3 flag
556	22C	1	Countdown timer 4 flag

USEFUL MEMORY LOCATIONS

Dec	Hex	Len	Function
558	22E	1	Countdown timer 5 flag
559	22F	1	DMA reg. (0=screen off, 34=normal)
560	230	2	Display list address
562	232	1	Serial port control
564	234	1	Light pen horiz. value
565	235	1	Light pen vert. value
580	244	1	Coldstart flag (1=reset will coldst.)
583	247	40	Physical line buffer - used by editor
624	270	8	Paddles
632	278	4	Joysticks
636	27C	8	Paddle triggers
644	284	4	Joystick triggers
656	290	1	Text window cursor row
657	291	2	Text window cursor column
660	294	2	Text window memory address
674	2A2	1	Escape flag - set by pressing ESC
675	2A3	15	Tab map (1=tab stop)
690	2B2	4	Logical line map (1=start logical line)
694	2B6	1	Inverse video flag - set by ATARI key
702	2BE	1	Shift lock (64=shift, 128=control)
703	2BF	1	Split screen flag (24=full, 4=split)
708	2C4	5	Playfield color registers
741	2E5	2	OS top of avail. mem. pointer
743	2E7	2	OS low mem. pointer
746	2EA	4	Device status buffer
752	2F0	1	Cursor inhibit (0=on, 1=off)
755	2F3	1	Char. mode (1=inv. blank, 0=inv. off)
756	2F4	1	Char. base address in pages
763	2FB	1	Last byte written to screen
764	2FC	1	Int. code of last key pressed
765	2FD	1	Color for FILL command
766	2FE	1	Display control char. flag
767	2FF	1	Start/stop for paging (control-1)
768	300	12	Device control block
794	31A	38	Handler address table
832	340	128	IOCB's
960	3C0	40	Printer buffer
1021	3FD	131	Cassette buffer
1536	600	256	Free memory
1913	779	1	Disk write command (87=verify, 80=no)
53279	D01F	1	Console switches
53760	D200	1	Audio channel 1 frequency
53761	D201	1	Audio channel 1 control
53762	D202	1	Audio channel 2 frequency
53763	D203	1	Audio channel 2 control
53764	D204	1	Audio channel 3 frequency
53765	D205	1	Audio channel 3 control
53766	D206	1	Audio channel 4 frequency
53767	D207	1	Audio channel 4 control
53768	D208	1	Audio control register
53769	D209	1	R-keyboard code/W-start timers
53770	D20A	1	R-rand. # gen./W-reset status
53771	D20B	1	R-vert. scan line/W-start pot scan
53773	D20D	1	R-serial port input reg./W-output
53774	D20E	1	R-IRQ interrupt status/W-IRQ enable
53775	D20F	1	R-serial port, kybd. stat./W-control reg.
54016	D300	1	Port A
54017	D301	1	Port B
54018	D302	1	Port A control reg. (52=cassette on, 60=cassette off)

USEFUL MEMORY LOCATIONS

Dec	Hex	Len	Function
54019	D303	1	Port B control register
54276	D404	1	Horiz. scroll register
54277	D405	1	Vert. scroll register
54282	D40A	1	W-wait for horiz. sync.
54283	D40B	1	R-vert. line counter
54286	D40E	1	Nonmaskable interrupt enable
54287	D40F	1	R-nonmask. status/W-nonmask. reset